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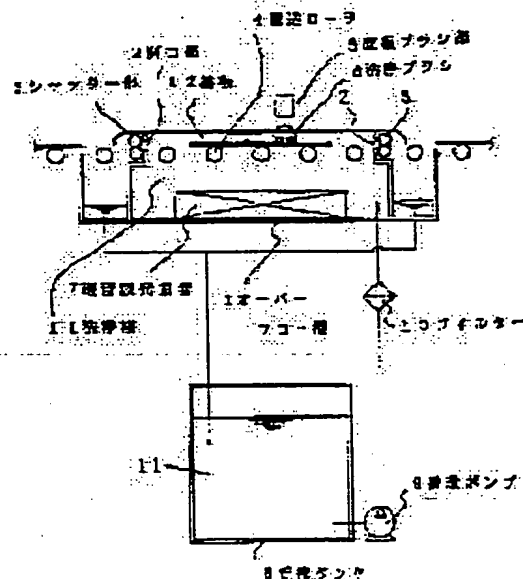
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(54) SUBSTRATE CLEANING DEVICE

(57)Abstract:

PURPOSE: To prevent the deterioration with age due to the pollution of a brush itself by moving a substrate between the opening parts of an overflow tank with the substrate in a clearing solvent, applying an ultrasonic wave to the clearing solvent to clean the substrate in the clearing solvent by brushing.

CONSTITUTION: A substrate 12 is moved in a right direction along a pass line by a transfer roller 4 and dipped into the liquid of an overflow tank 1 by way of a shutter part 3 and an opening part 2, and the surface of a substrate 12 is cleaned by scrubbing with a cleaning brush 6 of a rotary brush part 5. The rear surface of the substrate 12 and the cleaning brush 6 are cleaned with the effect of an ultrasonic wave from an ultrasonic wave oscillator 7. A cleaning solvent overflowed from an overflow tank 1 is collected into a storage tank 8. Thereby, the lowering of cleaning ability due to the pollution of the cleaning brush itself may be prevented.



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A. Relevance of the Above-identified Document

This document has relevance to claims 1, 27, and 33 of the present application.

B. Translation of the Relevant Passages of the Document

[ABSTRACT]

[OBJECT]

To prevent deterioration with age due to the pollution of a brush itself.

[CONSTITUTION]

Pollution of a washing brush 6 is prevented by applying ultrasonic waves to a cleaning liquid 11 in an overflow tank 1 by an ultrasonic wave generator 7, and by washing a substrate 12 in the cleaning solvent by the washing brush 6 of a rotating brush section 6.

[CLAIMS]

[Claim 1]

A substrate washing apparatus including an overflow tank, shutter sections, a transfer section, an ultrasonic wave generator, and a rotating brush section, wherein:

the overflow tank is for storing a cleaning

solvent, and is provided with slit-shaped opening sections in a vicinity of upper edges of facing sides for transferring in and out the substrate;

the shutter sections, disposed at the opening sections, are for opening and closing when the substrate is transferred in and out;

the transfer section is for transferring the substrate, which is soaked in, to between the opening sections of the overflow tank;

the ultrasonic wave generator is for applying the ultrasonic waves to the cleaning solvent in the overflow tank; and

the rotating brush section is for cleaning the substrate in the cleaning solvent in the overflow tank by a washing brush.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[INDUSTRIAL FIELD OF THE INVENTION]

The present invention relates to a substrate washing apparatus, and especially to a brush washing apparatus by a single wafer processing method.

[0002]

[PRIOR ART]

As shown in Figure 2, a conventional substrate washing apparatus has transfer rollers, which support

both edges of a substrate 12 that is not to be washed, disposed at an opening section in an upper part of a receiving tank 13 for a cleaning solvent 11. The transfer rollers 4 are arranged in a straight line with a predetermined pitch in order to structure a pass line.

[0003]

A set of rotating brush sections 5 is placed substantially in a middle part of the receiving tank 13, vertically with respect to the pass line. Further, a storage tank 8 is provided to below the receiving tank 13. Those tanks are connected to each other via a pipe.

[0004]

Moreover, spray nozzles 14, which are for feeding the cleaning solvent 11, are mounted in a vicinity of a tip of a washing brush 6. The spray nozzles are disposed straightly face to face across the pass line, just like the rotating brush sections.

[0005]

Note that, The spray nozzle 14 and the storage tank 8 are connected by a pipe via a circulation pump 9 and a filter 10.

[0006]

Next, a washing operation is explained below. As

shown in Figure 1, the substrate 12 is washed by scrubbing on both front and back sides spontaneously by the washing brush 6 that is attached to the tip of the rotating brush section 5, during a transfer of the substrate 12 along the pass line in a right-hand direction by the transfer rollers 4.

[0007]

Here, the cleaning solvent 11 is fed in the vicinity of the tip of the washing brush 6 from the opening of the spray nozzle 14 by using a pressure of the circulation pump 9.

[0008]

[PROBLEMS TO BE SOLVED BY THE INVENTION]

With this conventional substrate washing apparatus, such a phenomenon occurs that a brush itself is polluted abreast with a washing processing time, because impurities such as particles, which are removed from a surface of a substrate, go into an interior of the brush.

[0009]

As a result, the scrubbing of the surface of the substrate is carried out with the polluted brush. This presents a qualitative problem that a washing ability is significantly lowered.

[0010]

Furthermore, it is also a problem that frequent exchanges of the brush require a great number of steps.

[0011]

An object of the present invention is to provide a substrate washing apparatus in which prevented is a deterioration with age caused by the pollution of the brush itself.

[0012]

[MEANS TO SOLVE THE PROBLEMS]

In order to achieve the above object, a substrate washing apparatus of the present invention is provided with an overflow tank, shutter sectiona, a transfer section, an ultrasonic wave generator, and a rotating brush section, wherein: the overflow tank is for storing a cleaning solvent, and is provided with slit-shaped opening sections in a vicinity of upper edges of facing sides for transferring in and out the substrate; the shutter sections, disposed at the opening sections, are for opening and closing when the substrate is transferred in and out; the transfer section is for transferring the substrate, which is soaked in, to between the opening sections of the overflow tank; the ultrasonic wave generator is for applying the ultrasonic waves to the cleaning solvent in the overflow tank; and the rotating brush section is for

cleaning the substrate in the cleaning solvent in the overflow tank by a washing brush.

[0013]

[EFFECT]

By soaking a washing brush in a cleaning solvent all the time, an ultrasonic washing of the washing brush is carried out in order to prevent a pollution by the brush itself.

[0014]

[EMBODIMENTS]

The present invention is explained below, referring to drawings. Figure 1 is a sectional view showing a first embodiment of the present invention.

[0015]

In Figure 1, an overflow tank 1 for a cleaning solvent 11 is provided with opening sections 2, in a slit shape, which is for transferring a substrate 12 in and out and locate in upper parts of facing sides, shutter sections 3, in a roll shape, which are located adjacent the opening sections 2 and move upward and downward using their own weight in a manner synchronized with the passage of the substrate 12, and an ultrasonic wave generator 7 disposes on a bottom of the tank 1.

[0016]

As a transfer section for the substrate 12, a pass line for the substrate 12 is structured by disposing transfer rollers 4, which supports both edges of the substrate 12, along a straight line linking the opening sections 2, which are facing each other on the overflow tank 1. The transfer rollers 4 are disposed with a predetermined pitch.

[0017]

The rotating brush sections 5 are disposed substantially in a middle part of the overflow tank, so that washing brushes 6, which are attached to a tip of the rotating brush section 5, comes to the bottom of the rotating brush section 5, vertically with respect to the pass line of the substrate 12.

[0018]

A storage tank 8 is disposed below the overflow tank 1. The overflow tank 1 and the storage tank 8 constitute a circulation system by being connected by a recovering pipe system for the cleaning solvent 11 and a supplying pipe system including a circulation pump 9 and a filter 10.

[0019]

Next, a washing operation is explained below. The substrate 12 is transferred along the pass line in a right-hand direction by the transfer rollers 4, into a

liquid in the overflow tank 1 via the shutter section 3 and the opening section 2. Then, the surface of the substrate 12 is washed by scrubbing by the washing brush 6 that is attached to the tip of the rotating brush section 5.

[0020]

Moreover, the back side of the substrate 12 and the washing brush 6 are washed by an ultrasonic effect (that is, by a cavitation effect when generated wavelength is between 20KHZ and 40 KHZ, and by a vibration acceleration effect when it is about 1MHZ) by an ultrasonic wave generator 7.

[0021]

Note that, the cleaning solvent overflowed out of the overflow tank 1 is recovered into the storage tank 8. The cleaning solvent in the storage tank 8 is fed via the circulation pump 9. The cleaning solvent is filtered by passing through the filter 10, then is supplied into the overflow tank 1.

[0022]

[EFFECT OF THE INVENTION]

As discussed above, the present invention has an arrangement that a washing brush, which is soaked all the time in a cleaning solvent overflowing, is used for a washing carried out by an ultrasonic effect by an

ultrasonic wave generator. Thereby, deterioration of a washing ability due to a pollution of the washing brush itself can be prevented. Thus, quality can be improved, compared to a conventional technology.

[0023]

Further, because this can reduce a number of times to exchange the washing brush, a number of steps can be decreased.

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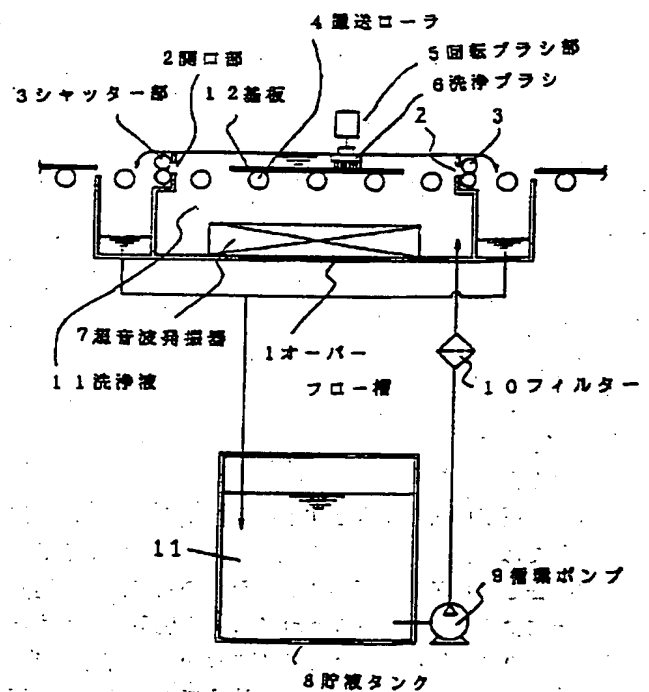
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(54)【発明の名称】 基板洗浄装置

(57)【要約】

【目的】 洗浄ブラシ自身の汚染による経時劣化を防止する。

【構成】 オーバーフロー槽1内の洗浄液11に超音波発振器7による超音波を作用させ、この洗浄液中で基板12を回転ブラシ部5の洗浄ブラシ6により洗浄し、洗浄ブラシ6の汚染を防止する。



【特許請求の範囲】

【請求項1】 オーバーフロー槽と、シャッター部と、搬送部と、超音波発振部と、回転ブラシ部とを有する基板洗浄装置であって、
 オーバーフロー槽は、洗浄液を収容し、対向する側面の上縁付近に基板の搬出入を行うためのスリット形状の開口部を有するものであり、
 シャッター部は、前記開口部に設けられ、基板の搬出入により開閉するものであり、
 搬送部は、オーバーフロー槽の開口部間に基板を洗浄液に浸漬して搬送するものであり、
 超音波発振部は、オーバーフロー槽の洗浄液に超音波を作用するものであり、
 回転ブラシ部は、前記オーバーフロー槽の洗浄液中で基板を洗浄ブラシにより洗浄するものであることを特徴とする基板洗浄装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は基板洗浄装置に関し、特に枚葉処理方式によるブラシ洗浄装置に関する。

【0002】

【従来の技術】 従来の基板洗浄装置は図2に示すように、洗浄液11の受槽13の上開口部に被洗浄物である基板12の両端を支持する搬送ローラ4が直線上に所定のピッチで配列され、バスラインを構成している。

【0003】 このバスラインに直交して対向する1組の回転ブラシ部5が受槽13のほぼ中央部に配設され、さらに、受槽13の下部には貯液タンク8を有し、両者は、互いに配管接続されている。

【0004】 また、洗浄ブラシ6の先端近傍に洗浄液11を供給するためのスプレーノズル14が回転ブラシ部5と同様にバスラインに対向して配設されている。

【0005】 なお、スプレーノズル14と貯液タンク8とは、循環ポンプ9とフィルター10を中継して配管接続されている。

【0006】 次に洗浄動作について説明する。図1に示すように基板12は、搬送ローラ4によりバスラインに沿って右方向に搬送されながら、回転ブラシ部5の先端部に装着された洗浄ブラシ6によって基板12の表・裏面が同時にスクラブ洗浄される。

【0007】 このとき、洗浄液11は循環ポンプ9の圧力によりスプレーノズル14の口より洗浄ブラシ6の先端近傍に供給される。

【0008】

【発明が解決しようとする課題】 この従来の基板洗浄装置では、洗浄処理時間の経過に伴って、基板の表面から除去した粒子等の不純物がブラシの内部に入り込み、徐々にブラシ自身が汚染されるという現象が発生する。

【0009】 そのため基板の表面が汚染されたブラシにより擦られる結果となり、洗浄能力が著しく低下する

という品質面での問題点があった。

【0010】 さらに、頻繁にブラシを交換するための多大な工数が発生するという問題点があった。

【0011】 本発明の目的は、ブラシ自身の汚染による経時劣化を防止した基板洗浄装置を提供することにある。

【0012】

【課題を解決するための手段】 前記目的を達成するため、本発明に係る基板洗浄装置は、オーバーフロー槽と、シャッター部と、搬送部と、超音波発振部と、回転ブラシ部とを有する基板洗浄装置であって、オーバーフロー槽は、洗浄液を収容し、対向する側面の上縁付近に基板の搬出入を行うためのスリット形状の開口部を有するものであり、シャッター部は、前記開口部に設けられ、基板の搬出入により開閉するものであり、搬送部は、オーバーフロー槽の開口部間に基板を洗浄液に浸漬して搬送するものであり、超音波発振部は、オーバーフロー槽の洗浄液に超音波を作用するものであり、回転ブラシ部は、前記オーバーフロー槽の洗浄液中で基板を洗浄ブラシにより洗浄するものである。

【0013】

【作用】 洗浄ブラシを常時洗浄液中に浸漬させ、洗浄ブラシを超音波洗浄することによりブラシ自身による汚染を防止する。

【0014】

【実施例】 次に本発明について図面を参照して説明する。図1は本発明の一実施例を示す断面図である。

【0015】 図1において、洗浄液11のオーバーフロー槽1は、対向する側面の上部に基板12を搬出入するためのスリット形状の開口部2と、開口部2に隣接して基板12の通過に同期して自重にて上下するロール形状のシャッター部3と、槽1の底部に配置した超音波発振器7とを有している。

【0016】 基板12の搬送部としては、オーバーフロー槽1の対向する開口部2を結ぶ直線上に基板12の両端を支持する搬送ローラ4を所定のピッチで配列して、基板12のバスラインを構成する。

【0017】 回転ブラシ部5は、先端部に装着した洗浄ブラシ6を下にして基板12のバスラインに直交してオーバーフロー槽1のほぼ中央部に配設する。

【0018】 オーバーフロー槽1の下部には貯液タンク8を配置し、オーバーフロー槽1と貯液タンク8とは、洗浄液11の回収系の配管系及び循環ポンプ9やフィルター10等を有する供給系の配管にて連結され循環システムを構成している。

【0019】 次に洗浄動作について説明すると、基板12は、搬送ローラ4によりバスラインに沿って右方向に搬送され、シャッター部3及び開口部2を経由してオーバーフロー槽1の液中に搬送されて回転ブラシ部5の洗浄ブラシ6によって基板12の表面がスクラブ洗浄され

